



A.D. 1857 N° 1522.

S P E C I F I C A T I O N

OF

PETER ARMAND LE COMTE DE
FONTAINEMOREAU.

FURNACES.

L O N D O N :

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1857.



A.D. 1857 N° 1522.

Furnaces.

LETTERS PATENT to Peter Armand le Comte de Fontainemoreau, of London, Paris, and Brussels, Patent Solicitor, for the Invention of “**IMPROVEMENTS IN THE CONSTRUCTION OF SMOKE-CONSUMING FURNACES, APPLICABLE TO BOILERS.**”—A communication.

Sealed the 20th October 1857, and dated the 29th May 1857.

PROVISIONAL SPECIFICATION left by the said Peter Armand le Comte de Fontainemoreau at the Office of the Commissioners of Patents, with his Petition, on the 29th May 1857.

I, PETER ARMAND le Comte DE FONTAINEMOREAU, of London, Paris, and
5 Brussels, Patent Solicitor, do hereby declare the nature of the Invention of
“**IMPROVEMENTS IN THE CONSTRUCTION OF SMOKE-CONSUMING FURNACES, APPLICABLE
TO BOILERS,**” to be as follows, that is to say:—

The Invention consists in constructing the furnaces of locomotive or
stationary boilers with a peculiar arrangement of valves, levers, and flues or
10 pipes, so that the smoke is made to return to the furnace to be consumed.

The furnace is formed with two fire boxes, separated by a water chamber
or hollow partition, which, for boilers of fixed engines, may be replaced by a
partition of refractory brick.

Each fire box has a separate ash pan and smoke box, and each smoke box
15 has two openings made in it, one of which corresponds direct with the chimney,
and the other with a pipe or brick flue. This pipe or flue serves for conducting
the smoke of the fire box last charged under the grate of the fire box pre-
viously charged, the smoke of which is already consumed.

De Fontainemoreau's Impts. in the Construction of Smoke-consuming Furnaces.

The openings and the ash pans are provided with valves corresponding together, and which may be opened and closed alternately by means of a lever, or other suitable mechanism, thus allowing the smoke of the fire box to be brought direct under the grate of the left fire box, and vice versâ.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed 5 by the said Peter Armand le Comte de Fontainemoreau in the Great Seal Patent Office on the 28th November 1857.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, PETER ARMAND le Comte de FONTAINEMOREAU, of London, Paris, and Brussels, Patent Solicitor, send greeting. 10

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-ninth day of May, in the year of our Lord One thousand eight hundred and fifty-seven, in the twentieth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Peter Armand le Comte de Fontainemoreau, Her special license that I, 15 the said Peter Armand le Comte de Fontainemoreau, my executors, administrators, and assigns, or such others as I, the said Peter Armand le Comte de Fontainemoreau, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, 20 exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention of "IMPROVEMENTS IN THE CONSTRUCTION OF SMOKE-CONSUMING FURNACES," communicated to me by a foreigner residing abroad, upon the condition (amongst others) that I, the said Peter Armand le Comte de Fontainemoreau, by an instrument in writing 25 under my hand and seal, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent. 30

NOW KNOW YE, that I, the said Peter Armand le Comte de Fontainemoreau, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, reference being had to the annexed Sheet of Drawings, and to the figures and letters marked thereon, that is 35 to say:—

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The improvements consist in constructing the furnaces of locomotive or stationary boilers with a peculiar arrangement of valves, levers, and flues or pipes, so as to cause the smoke to return to the furnace to be consumed.

The furnaces are composed of two fire boxes, separated by a water
5 chamber, which, in the case of boilers of stationary engines, may be replaced by a refractory brick partition, joined air-tight to the whole length of the boiler. Each fire box or furnace is provided with a separate ash and smoke box, and each smoke box is furnished with two orifices, one corresponding direct with the chimney, and the other with a metallic pipe or flue, (which
10 flue in stationary engines may be made of brick,) for conducting the smoke from the furnace last fed under the grate of the furnace previously fed, and the smoke of which is already consumed. The openings of the smoke and ash boxes are provided with valves corresponding with each other, and which, by means of a lever or other suitable mechanism, may be opened and shut
15 alternately, to permit of the smoke from the furnace on the right being conducted under the grate of the furnace on the left, and vice versâ. By this arrangement, the smoke of the furnace last fed is made to pass through the fire of the furnace previously fed, which communicates with the chimney, and in which the coal is already reduced by combustion to coke without any
20 smoke. The chimney causes a draught of air to pass through the grate of the furnace in communication with it, and as by this arrangement the ash box is closed, the draught caused by the chimney draws the smoke through the connecting pipe, which at one end communicates with the smoke box of the furnace last fed, and at the other end with the opening in the ash box
25 previously fed; it becomes therefore evident that the smoke is consumed.

For the better understanding of the Invention communicated to me, I will proceed to describe the Drawings hereto annexed.

Figure 1 is a side elevation of a locomotive to which the improved furnace is applied; Figure 2 is a front elevation of the same; Figure 3, section
30 through the smoke box; Figure 4, horizontal section through the pipes G, H, of the smoke box; and Figure 5 is a view of the fire boxes in section. A, B, fire boxes; J, water chamber separating the fire boxes; *a*, *b*, ash box, divided into two parts by a wrought-iron plate *n*; F, G, pipes for conducting the smoke into the ash boxes *a*, *b*; D, part of the smoke box, corresponding with the fire box B; C, part of the smoke box, corresponding with the fire box A;
35 K, K¹, valves for closing the ash boxes *a*, *b*; F¹, G¹, openings, corresponding with the pipes F, G; O, O¹, orifices corresponding direct with the chimneys; L, *l*, slide valves for opening and closing alternately the openings F¹, O, and O¹, G; N, lever working the valves K, K¹, and slides L, *l*. The fire boxes

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A, B, are divided by means of a water chamber J placed vertically; the ash pan is also divided by the sheet-iron plate *n*, which fits air-tight to the lower part of the water chamber J and to the sides of the ash pan; by this means for the same boiler there are two fire boxes A, B, with their respective ash pans *a*, *b*. The ash pans *a*, *b*, are provided with clack valves K, K¹, which are 5 worked by means of a lever N. This lever being lowered in front, closes the valve K¹ and opens the valve K, and vice versâ. The smoke box is divided into three parts, and closed air-tight by means of a vertical plate, and also with a horizontal plate I, placed at the lowest height of the water in the boiler. This horizontal plate is perforated with four holes F¹, O, O¹, G¹, which are 10 opened and shut by means of slide valves L, *l*, put in motion by the lever N and the rod M. By this arrangement the fire box A corresponds with the smoke box C, and the fire box B with the smoke box D. Thus each fire box has a special smoke box, and the chimney corresponds with the upper part E of the smoke box. The orifices O, O¹, in the horizontal partition of the smoke 15 box correspond direct with the chimney, and the orifice F¹ corresponds by means of the pipe F with the ash box *a*, and the orifice G¹ corresponds by means of the pipe G with the ash box *b*. Thus, if the valve K¹ of the ash box A is closed, the slide valve *l* will close the orifice G¹ and open the orifice O¹, which puts the fire box A in communication with the chimney, and at the 20 same time opens the valve K of the ash box *b*, and the slide valve L opens the orifice F and closes the orifice O, and thereby intercepts the communication between the furnace B and the chimney. The smoke from this furnace when first fed with fuel being attracted by the draught produced in the chimney, after passing over the furnace A enters through the pipe F into the ash box *a*, 25 thence through the fire first lighted in the furnace A, and becomes consumed. As soon as one of the furnaces requires to be fed, the stoker opens the valve of the ash box of the furnace to be fed.

Figures 6, 7, 8, 9, and 10 are sectional views of the improved arrangements for consuming smoke applied to the boilers of a stationary steam engine. 30 The gases disengaged by the combustion in the furnace A, supposed to be recently fed, return by the side flue *a*, and there coming in contact with the valve D, which intercepts their passage into the common pipe C, they then enter the ash pit *a*¹, where, in consequence of the valve L being closed in front, the gases by the action of the draught of the chimney pass through the 35 incandescent fuel in the furnace B and become ignited and consumed. The products of combustion afterwards pass through the flues *b*, and through the common pipe C into the chimney, the valve D¹ intercepting their passage into the ash pit *b*¹. As soon as the coal in the furnace A becomes red hot,

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the stoker by lowering the lever N opens the valve of the furnace B, which is then fed with fuel. By this means the gases are made to pass through the flues *b*, and through the opening of the valve *D*¹ into the ash pit *b*¹ of the furnace A. The valve *L*¹ being closed, the said gases pass through the incan-
5 descent fuel in the furnace A, become consumed, and the products pass off through the flues *a*, and through the common pipe C into the chimney, being prevented from entering the ash pit *a*¹ by the valve D being closed. The movement of the valves and registers serving to open and shut the openings for the admission of air necessary for the combustion of the gases is obtained
10 by the horizontal shaft P, and the connecting rods Q, Q¹, for working the valves D, D¹, and the connecting rods R, R¹, for actuating the valves L, L¹, and the rods S, S¹, for the registers T, T¹. The horizontal shaft P is put in action by the lever N, which the stoker lowers and raises alternately before feeding the furnaces. The valves not being exposed to the direct action of
15 the furnaces, and being placed at a part where the heat is moderate, they last a long time.

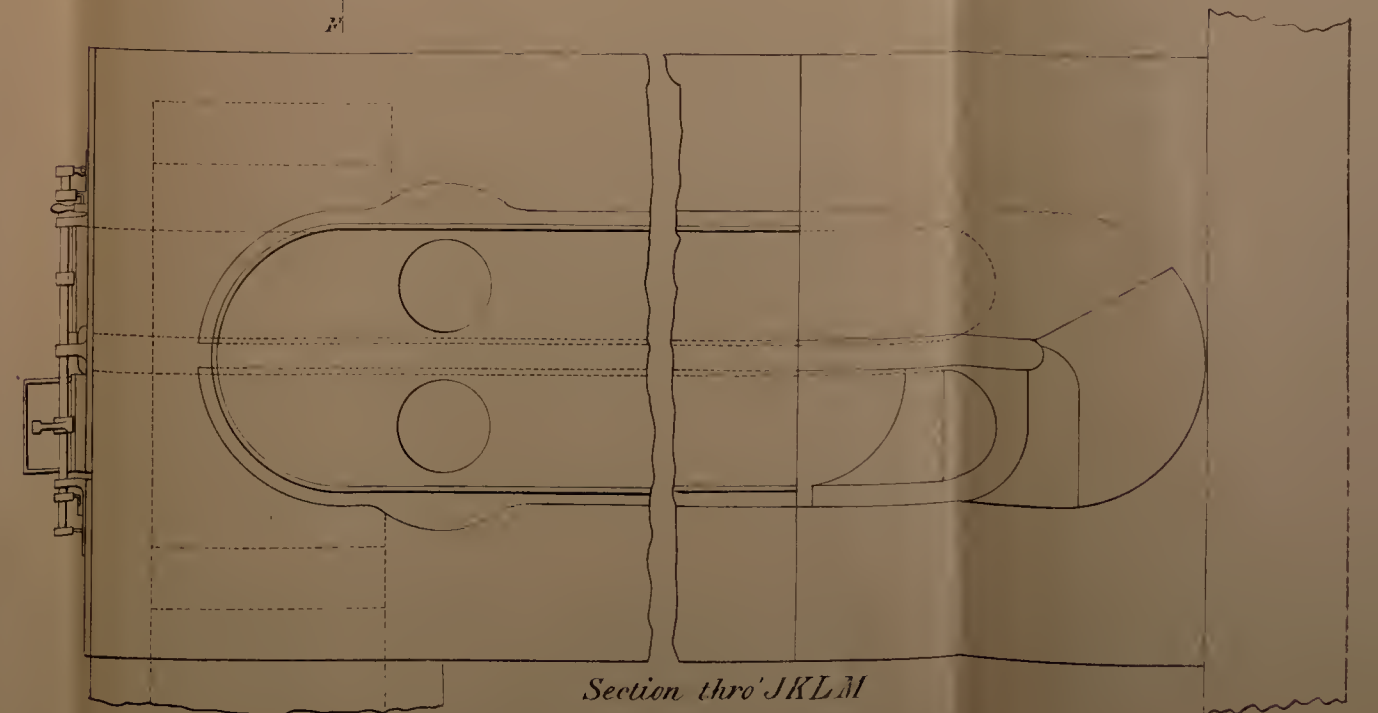
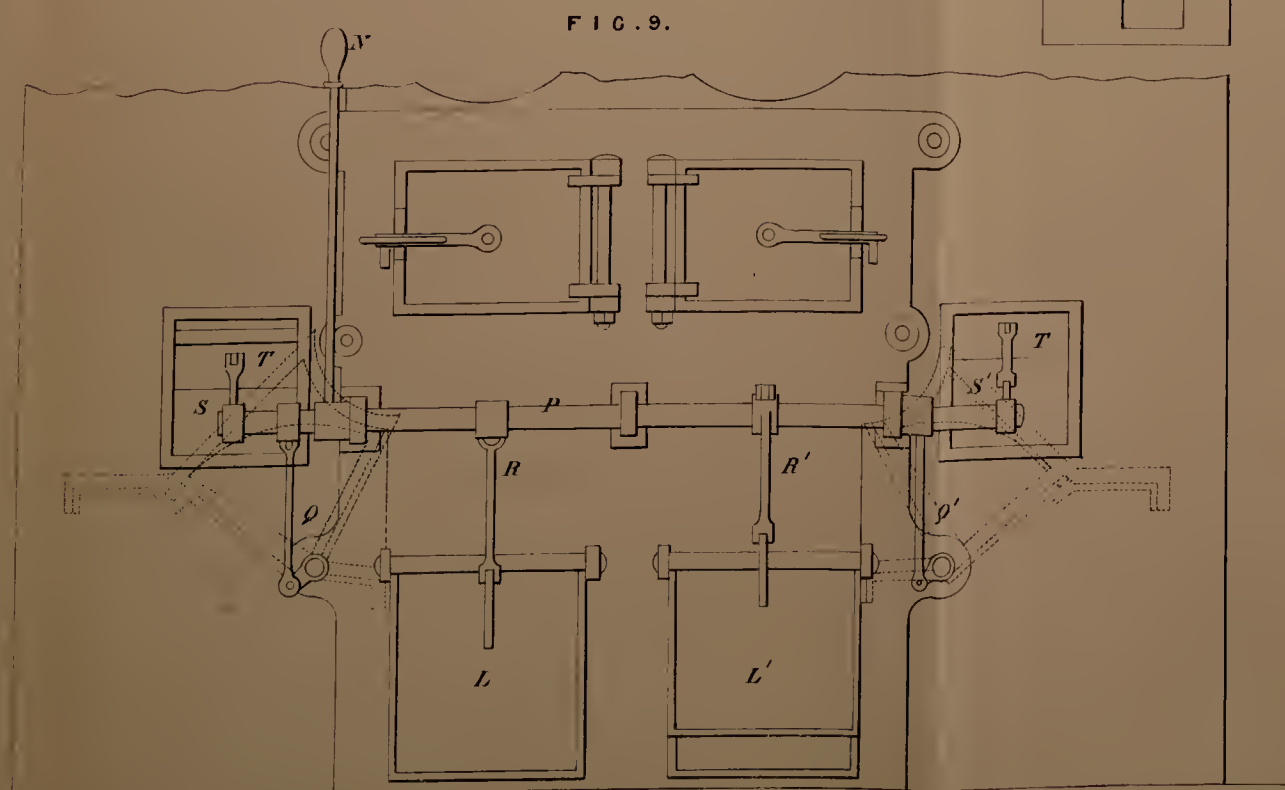
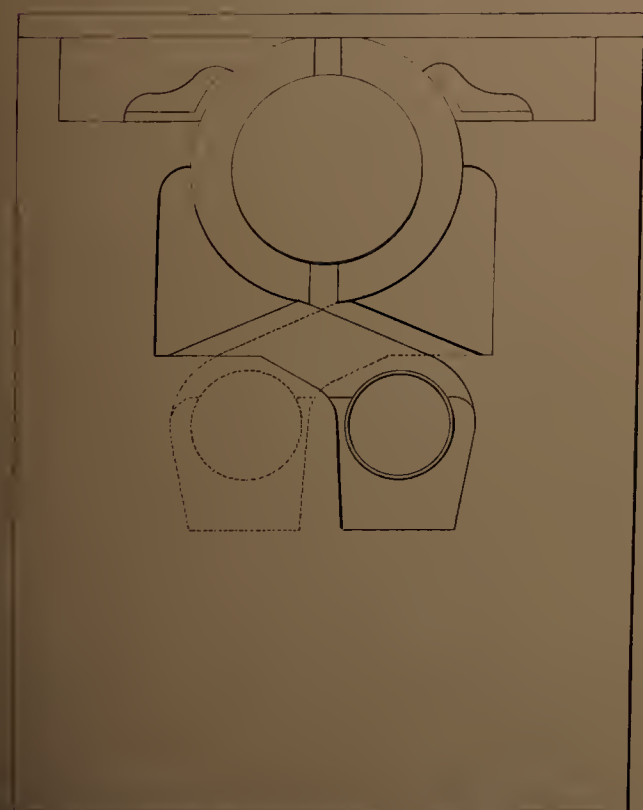
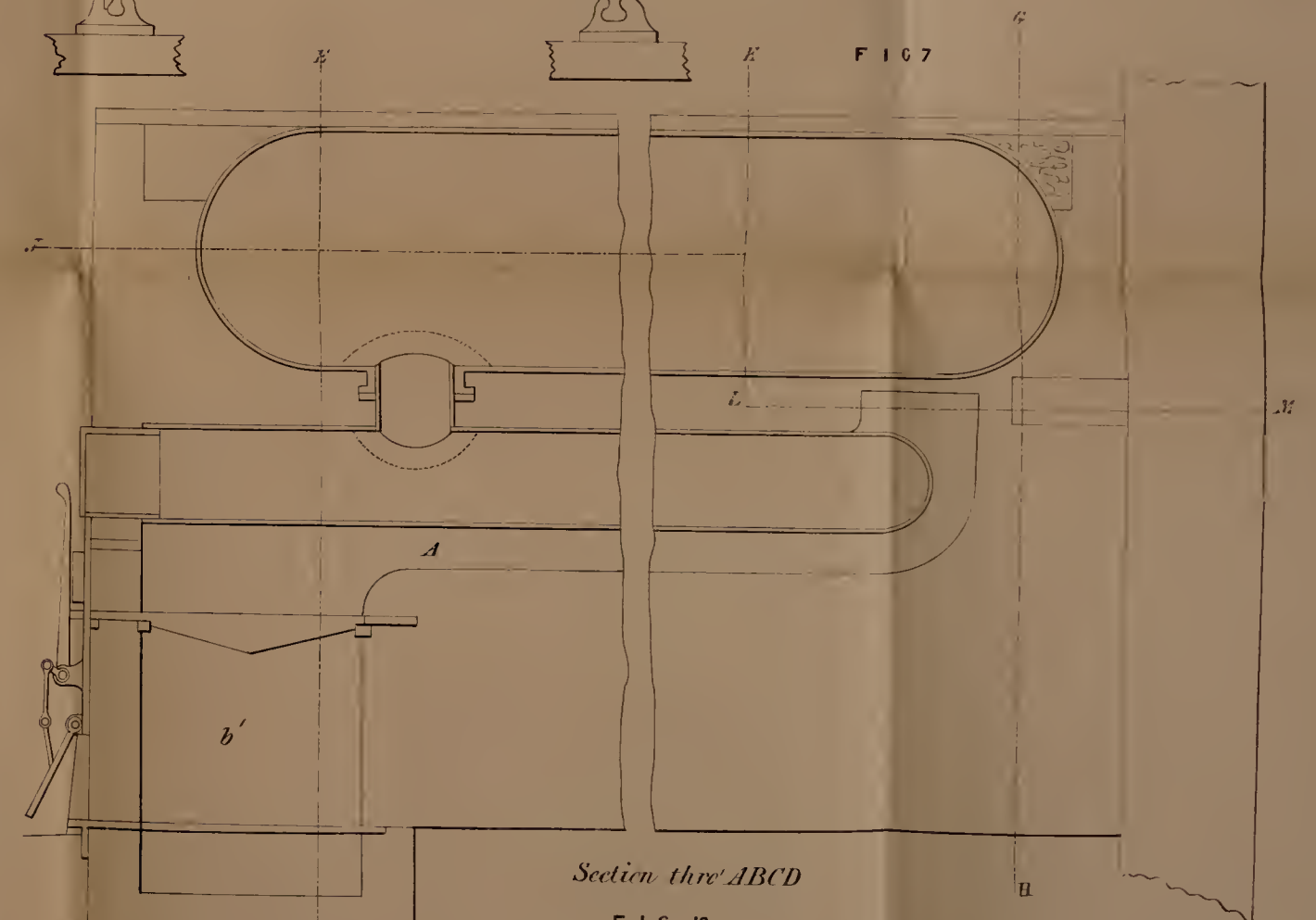
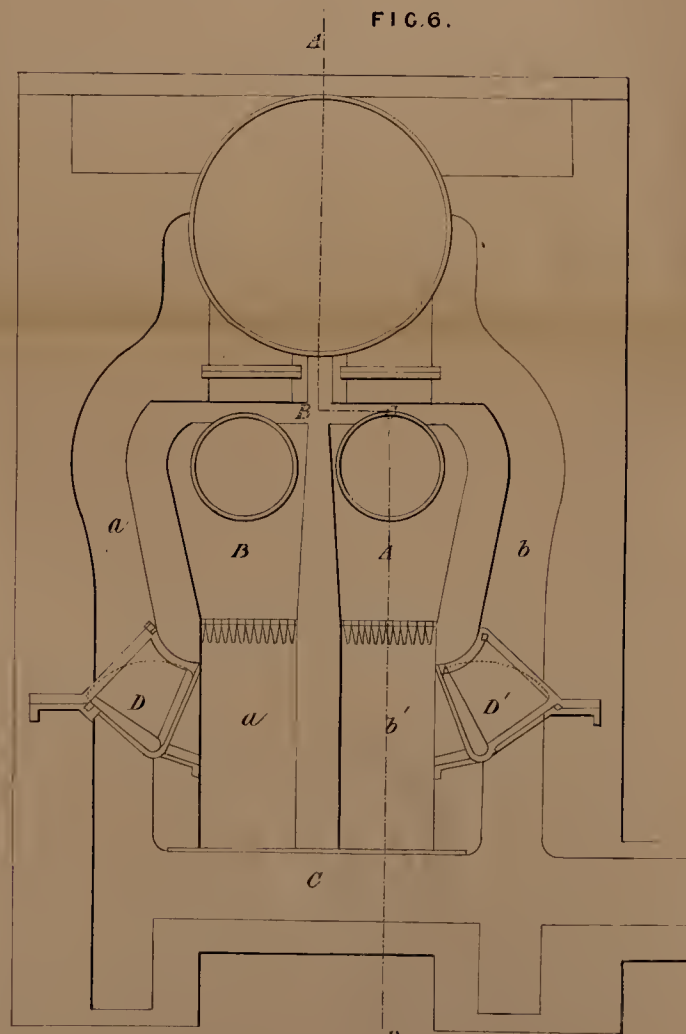
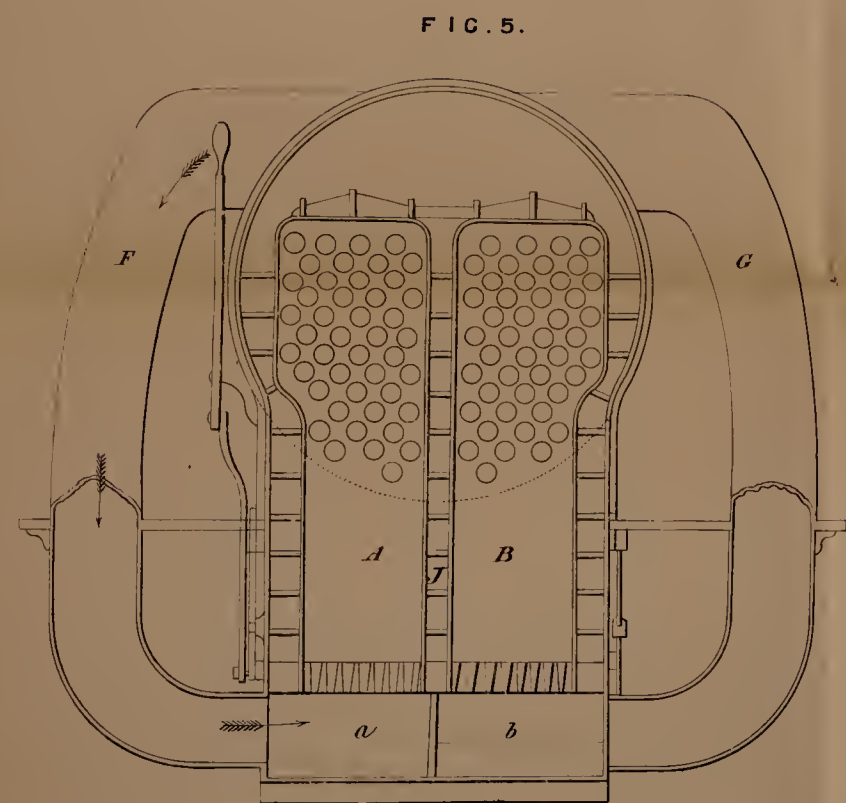
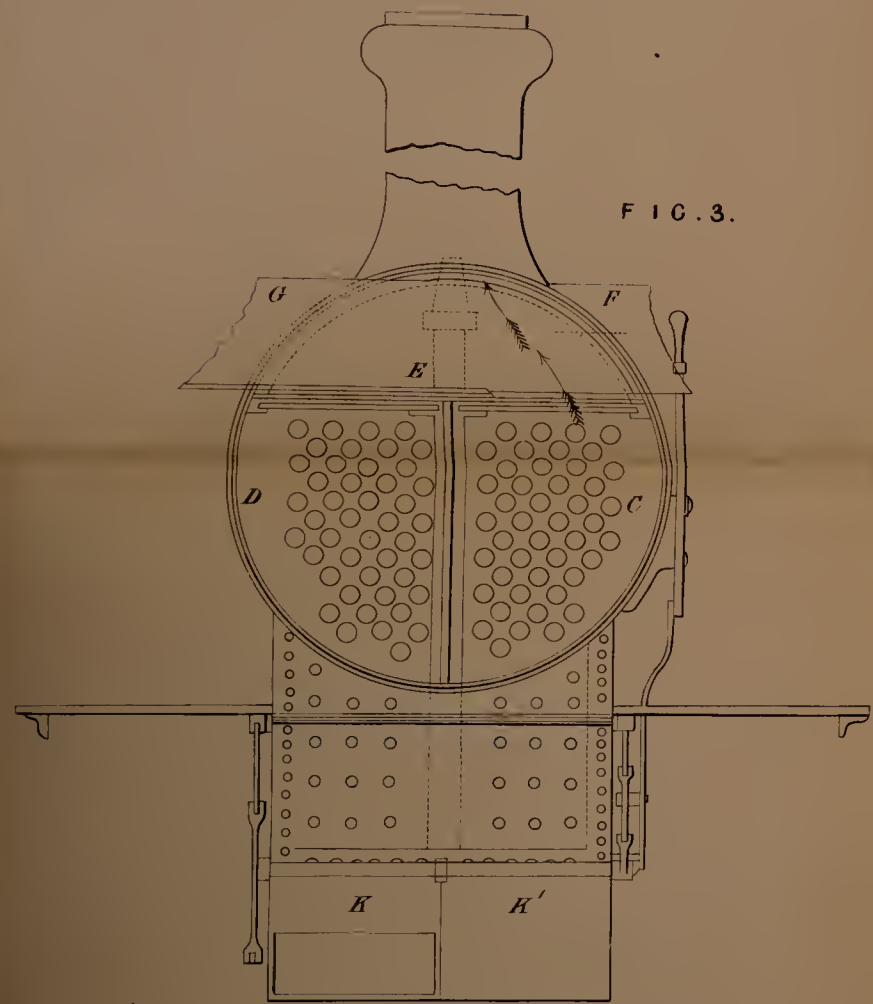
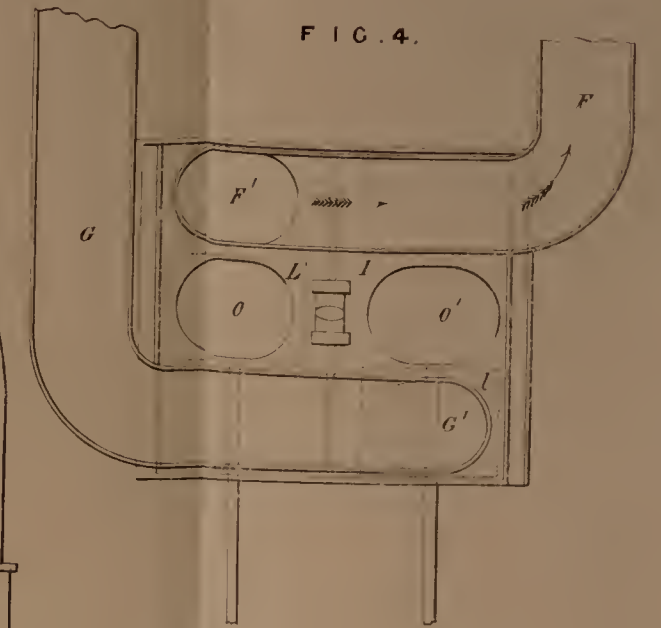
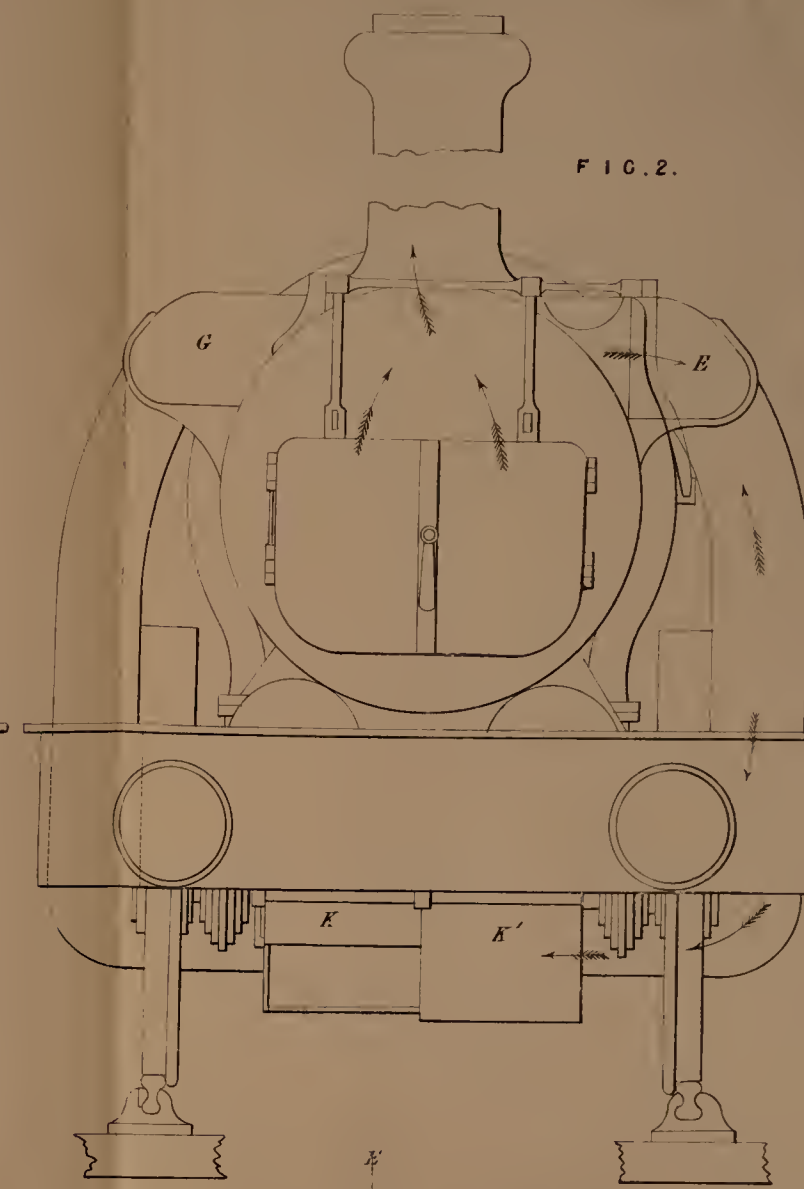
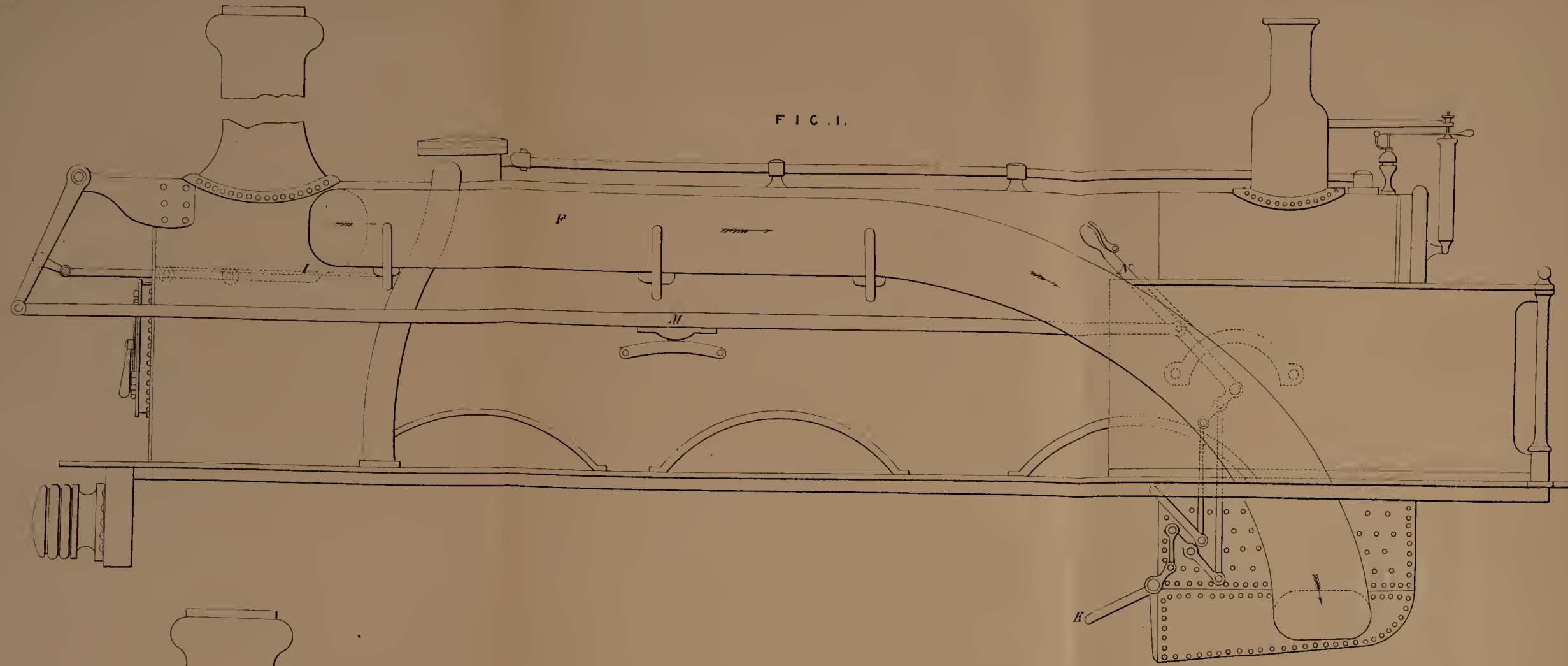
Having now described the nature of the Invention, and the manner of performing the same, I observe, in conclusion, that I do not confine myself to the details of construction, reserving the right to modify the same; but what I
20 claim as new and useful is, the improved construction of smoke-consuming furnaces of locomotive or stationary boilers, with an arrangement of valves, levers, pipes or flues, ash boxes or pits, as herein-before described, and represented in the accompanying Drawing.

In witness whereof, I, the said Peter Armand le Comte de Fontaine-
25 moreau, have hereunto set my hand and seal, this Twenty-fourth day of November, One thousand eight hundred and fifty-seven.

L' DE FONTAINEMOREAU. (L.S.)

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Section thro' GH.

Section thro' EF.

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